

Cardiovascular Dynamics



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1. Identify each of the following variables in Poiseuille's equation:

ΔP = _____

r^4 = _____

η = _____

l = _____

2. Explain how each of the following variables affects blood flow.

ΔP : _____

r^4 : _____

η : _____

l : _____

3. What could cause an increase in the peripheral resistance in a blood vessel?

4. Describe the cardiac cycle.

5. Match each of the definitions in Column A with the appropriate term in Column B.

Column A

- _____ ventricular contraction
- _____ the amount of blood each ventricle pumps per minute
- _____ the amount of blood pumped to the body per contraction per ventricle
- _____ the volume of blood in the heart at the end of ventricular contraction
- _____ ventricular relaxation
- _____ contraction that occurs when the volume of blood in the ventricles remains constant
- _____ the ejection of blood near the end of systole during which ventricular pressure rises and then begins to decline
- _____ the volume of blood in the heart at the end of ventricular relaxation

Column B

- a. diastole
- b. systole
- c. end diastolic volume (EDV)
- d. end systolic volume (ESV)
- e. cardiac output
- f. stroke volume
- g. isovolumetric contraction
- h. ventricular ejection

6. Define Starling's Law.

7. What differences would you expect to see between a diseased heart with high peripheral resistance and the healthy heart of an athlete?

8. What was the effect of increasing flow tube radius on flow rate and flow volume?

9. Which variable had the strongest effect on fluid flow?

10. If the viscosity of blood were to increase, what could you do to keep the flow rate "normal"?

11. What would occur if the left side of the heart pumped faster than the right side?

12. What do the valves in the *Pump Mechanics* screen do?

13. Match the terms in the right hand column to the simulation equipment from the *Pump Mechanics* screen.

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|--|--|
| _____ fluid in left beaker | a. vein |
| _____ middle beaker | b. blood going to the rest of the body |
| _____ fluid in right beaker | c. artery |
| _____ flow tube between left and middle beakers | d. blood coming from the lungs |
| _____ flow tube between middle and right beakers | e. left side of the heart |

